

# Organized sports, informal play, and the development of sport expertise: Reliability of retrospective recall

**Melissa Hopwood<sup>1,2</sup>**

Joseph Baker<sup>2</sup>, Clare MacMahon<sup>1</sup>, Damian Farrow<sup>1,3</sup>

<sup>1</sup> Victoria University, Melbourne, Australia

<sup>2</sup> York University, Toronto, Canada

<sup>3</sup> Australian Institute of Sport, Canberra, Australia



AUSTRALIAN  
INSTITUTE OF SPORT



# Introduction

- Highly skilled athletes report participating in a variety of sports prior to specialization
  - Gulbin et al., 2010; Memmert et al., 2010; Baker et al., 2003; Hill, 1993
- Highly skilled athletes report participating in substantial hours of deliberate play
  - Ford et al. 2009; Berry et al., 2008; Soberlak & Côté, 2003; Côté, 1999
- Investigations of sport expertise development are limited by the reliability of retrospective recall
  - Côté et al., 2005; Ward et al., 2004; Helsen et al. 1998

# The Developmental History of Athletes Questionnaire (DHAQ)

- Demographics
- Performance milestones
- Training and competition history
- Coaching history
- Sport science / sport medicine support
- Injury history
- Participation in organized sports and playful sporting games
- Familial involvement in sport and physical activity

# Methods

- 15 Australian national level athletes:
  - 8 Field hockey
  - 7 SwimmingAverage age 21.5 years
- 4-6 test procedures:
  - DHAQ 1
  - Athlete interview
  - DHAQ 2
  - Parent interview
  - Coach A interview
  - Coach B interview
- Reliability analysis:
  - Percent agreement (PA)
  - Intraclass correlation coefficient (ICC)

# Results: Number of organized sports

DHAQ 1	DHAQ 2	Interview	Parent
3.67 ± 1.76	2.64 ± 1.63	4.00 ± 2.56	4.00 ± 1.58

## DHAQ 1 : DHAQ 2

PA = 70% ± 27%  
ICC = .71 ; p < .01

## DHAQ 1 : Parent

PA = 66% ± 15%  
ICC = .42 ; p > .05

## DHAQ 1 : Interview

PA = 86% ± 19%  
ICC = .80 ; p < .01

## Interview : Parent

PA = 64% ± 26%  
ICC = .09 ; p > .05

<b>Participant</b>	<b>DHAQ 1</b>	<b>DHAQ 2</b>	<b>Interview</b>	<b>Parent</b>
<b>Mean</b>	3.67 ± 1.76	2.64 ± 1.63	4.00 ± 2.56	4.00 ± 1.58
<b>1</b>	6	5	6	5
<b>2</b>	3	0	3	-
<b>3</b>	5	4	5	5
<b>4</b>	7	-	11	4
<b>5</b>	3	4	2	5
<b>6</b>	2	2	2	4
<b>7</b>	4	-	3	7
<b>8</b>	3	2	3	6
<b>9</b>	5	5	5	4
<b>10</b>	2	1	2	3
<b>11</b>	3	-	2	2
<b>12</b>	2	-	3	3
<b>13</b>	3	2	6	2
<b>14</b>	1	1	1	2
<b>15</b>	6	4	6	-

<b>Participant</b>	<b>DHAQ 1</b>	<b>DHAQ 2</b>	<b>Interview</b>	<b>Parent</b>
<b>Mean</b>	3.67 ± 1.76	2.64 ± 1.63	4.00 ± 2.56	4.00 ± 1.58
<b>1</b>	6	5	6	5
<b>2</b>	3	0	3	-
<b>3</b>	5	4	5	5
<b>4</b>	7	-	11	4
<b>5</b>	3	4	2	5
<b>6</b>	2	2	2	4
<b>7</b>	4	-	3	7
<b>8</b>	3	2	3	6
<b>9</b>	5	5	5	4
<b>10</b>	2	1	2	3
<b>11</b>	3	-	2	2
<b>12</b>	2	-	3	3
<b>13</b>	3	2	6	2
<b>14</b>	1	1	1	2
<b>15</b>	6	4	6	-

<b>Participant</b>	<b>DHAQ 1</b>	<b>DHAQ 2</b>	<b>Interview</b>	<b>Parent</b>
<b>Mean</b>	3.67 ± 1.76	2.64 ± 1.63	4.00 ± 2.56	4.00 ± 1.58
<b>1</b>	6	5	6	5
<b>2</b>	3	0	3	-
<b>3</b>	5	4	5	5
<b>4</b>	7	-	11	4
<b>5</b>	3	4	2	5
<b>6</b>	2	2	2	4
<b>7</b>	4	-	3	7
<b>8</b>	3	2	3	6
<b>9</b>	5	5	5	4
<b>10</b>	2	1	2	3
<b>11</b>	3	-	2	2
<b>12</b>	2	-	3	3
<b>13</b>	3	2	6	2
<b>14</b>	1	1	1	2
<b>15</b>	6	4	6	-



<b>Participant</b>	<b>DHAQ 1</b>	<b>DHAQ 2</b>	<b>Interview</b>	<b>Parent</b>
<b>Mean</b>	3.67 ± 1.76	2.64 ± 1.63	4.00 ± 2.56	4.00 ± 1.58
<b>1</b>	6	5	6	5
<b>2</b>	3	0	3	-
<b>3</b>	5	4	5	5
<b>4</b>	7	-	11	4
<b>5</b>	3	4	2	5
<b>6</b>	2	2	2	4
<b>7</b>	4	-	3	7
<b>8</b>	3	2	3	6
<b>9</b>	5	5	5	4
<b>10</b>	2	1	2	3
<b>11</b>	3	-	2	2
<b>12</b>	2	-	3	3
<b>13</b>	3	2	6	2
<b>14</b>	1	1	1	2
<b>15</b>	6	4	6	-

# Results: Total hours of organized sports

Sport	DHAQ 1	DHAQ 2	Reliability
All sports combined	1352 ± 1444	1576 ± 1836	PA = 72% ± 29% ICC = .98; p < .01

# Results: Total hours of organized sports

Sport	DHAQ 1	DHAQ 2	Reliability
All sports combined	1352 ± 1444	1576 ± 1836	PA = 72% ± 29% ICC = .98; p < .01
1	328 ± 255	295 ± 262	PA = 58% ± 31% ICC = .82; p < .01
2	518 ± 819	568 ± 1105	PA = 51% ± 35% ICC = .98; p < .01
3	303 ± 600	389 ± 920	PA = 58% ± 43% ICC = .96; p < .01

<b>Participant</b>	<b>DHAQ 1</b>	<b>DHAQ 2</b>	<b>PA</b>
<b>Mean</b>	328 ± 255	295 ± 262	58% ± 31%
<b>1</b>	501	565	89
<b>2</b>	257	0	0
<b>3</b>	539	719	75
<b>4</b>	488	-	-
<b>5</b>	64	51	80
<b>6</b>	342	0	0
<b>7</b>	103	-	-
<b>8</b>	822	539	66
<b>9</b>	154	205	75
<b>10</b>	154	205	75
<b>11</b>	154	-	-
<b>12</b>	321	-	-
<b>13</b>	822	514	63
<b>14</b>	77	103	75
<b>15</b>	128	51	40

<b>Participant</b>	<b>DHAQ 1</b>	<b>DHAQ 2</b>	<b>PA</b>
<b>Mean</b>	328 ± 255	295 ± 262	58% ± 31%
<b>1</b>	501	565	89
<b>2</b>	257	0	0
<b>3</b>	539	719	75
<b>4</b>	488	-	-
<b>5</b>	64	51	80
<b>6</b>	342	0	0
<b>7</b>	103	-	-
<b>8</b>	822	539	66
<b>9</b>	154	205	75
<b>10</b>	154	205	75
<b>11</b>	154	-	-
<b>12</b>	321	-	-
<b>13</b>	822	514	63
<b>14</b>	77	103	75
<b>15</b>	128	51	40

<b>Participant</b>	<b>DHAQ 1</b>	<b>DHAQ 2</b>	<b>PA</b>
<b>Mean</b>	328 ± 255	295 ± 262	58% ± 31%
<b>1</b>	501	565	89
<b>2</b>	257	0	0
<b>3</b>	539	719	75
<b>4</b>	488	-	-
<b>5</b>	64	51	80
<b>6</b>	342	0	0
<b>7</b>	103	-	-
<b>8</b>	822	539	66
<b>9</b>	154	205	75
<b>10</b>	154	205	75
<b>11</b>	154	-	-
<b>12</b>	321	-	-
<b>13</b>	822	514	63
<b>14</b>	77	103	75
<b>15</b>	128	51	40

<b>Participant</b>	<b>DHAQ 1</b>	<b>DHAQ 2</b>	<b>PA</b>
<b>Mean</b>	328 ± 255	295 ± 262	58% ± 31%
<b>1</b>	501	565	89
<b>2</b>	257	0	0
<b>3</b>	539	719	75
<b>4</b>	488	-	-
<b>5</b>	64	51	80
<b>6</b>	342	0	0
<b>7</b>	103	-	-
<b>8</b>	822	539	66
<b>9</b>	154	205	75
<b>10</b>	154	205	75
<b>11</b>	154	-	-
<b>12</b>	321	-	-
<b>13</b>	822	514	63
<b>14</b>	77	103	75
<b>15</b>	128	51	40

# Results: Number of playful sporting games

DHAQ 1	DHAQ 2	Interview	Parent
3.20 ± 2.76	2.73 ± 2.10	4.33 ± 2.90	3.92 ± 2.75

## DHAQ 1 : DHAQ 2

PA = 70% ± 29%  
ICC = .67 ; p < .01

## DHAQ 1 : Parent

PA = 52% ± 31%  
ICC = .34 ; p > .05

## DHAQ 1 : Interview

PA = 65% ± 32%  
ICC = .70 ; p < .01

## Interview : Parent

PA = 60% ± 27%  
ICC = .28 ; p > .05



<b>Participant</b>	<b>DHAQ 1</b>	<b>DHAQ 2</b>	<b>Interview</b>	<b>Parent</b>
<b>Mean</b>	3.20 ± 2.76	2.73 ± 2.10	4.33 ± 2.90	3.92 ± 2.75
<b>1</b>	2	3	2	7
<b>2</b>	4	2	4	-
<b>3</b>	8	7	7	4
<b>4</b>	2	-	7	2
<b>5</b>	2	1	3	10
<b>6</b>	2	4	3	4
<b>7</b>	9	-	13	8
<b>8</b>	2	2	2	3
<b>9</b>	6	1	4	2
<b>10</b>	1	1	4	1
<b>11</b>	0	-	3	1
<b>12</b>	2	-	2	3
<b>13</b>	1	1	2	3
<b>14</b>	1	2	4	3
<b>15</b>	6	6	5	-

<b>Participant</b>	<b>DHAQ 1</b>	<b>DHAQ 2</b>	<b>Interview</b>	<b>Parent</b>
<b>Mean</b>	3.20 ± 2.76	2.73 ± 2.10	4.33 ± 2.90	3.92 ± 2.75
<b>1</b>	2	3	2	7
<b>2</b>	4	2	4	-
<b>3</b>	8	7	7	4
<b>4</b>	2	-	7	2
<b>5</b>	2	1	3	10
<b>6</b>	2	4	3	4
<b>7</b>	9	-	13	8
<b>8</b>	2	2	2	3
<b>9</b>	6	1	4	2
<b>10</b>	1	1	4	1
<b>11</b>	0	-	3	1
<b>12</b>	2	-	2	3
<b>13</b>	1	1	2	3
<b>14</b>	1	2	4	3
<b>15</b>	6	6	5	-

<b>Participant</b>	<b>DHAQ 1</b>	<b>DHAQ 2</b>	<b>Interview</b>	<b>Parent</b>
<b>Mean</b>	3.20 ± 2.76	2.73 ± 2.10	4.33 ± 2.90	3.92 ± 2.75
<b>1</b>	2	3	2	7
<b>2</b>	4	2	4	-
<b>3</b>	8	7	7	4
<b>4</b>	2	-	7	2
<b>5</b>	2	1	3	10
<b>6</b>	2	4	3	4
<b>7</b>	9	-	13	8
<b>8</b>	2	2	2	3
<b>9</b>	6	1	4	2
<b>10</b>	1	1	4	1
<b>11</b>	0	-	3	1
<b>12</b>	2	-	2	3
<b>13</b>	1	1	2	3
<b>14</b>	1	2	4	3
<b>15</b>	6	6	5	-

<b>Participant</b>	<b>DHAQ 1</b>	<b>DHAQ 2</b>	<b>Interview</b>	<b>Parent</b>
<b>Mean</b>	3.20 ± 2.76	2.73 ± 2.10	4.33 ± 2.90	3.92 ± 2.75
<b>1</b>	2	3	2	7
<b>2</b>	4	2	4	-
<b>3</b>	8	7	7	4
<b>4</b>	2	-	7	2
<b>5</b>	2	1	3	10
<b>6</b>	2	4	3	4
<b>7</b>	9	-	13	8
<b>8</b>	2	2	2	3
<b>9</b>	6	1	4	2
<b>10</b>	1	1	4	1
<b>11</b>	0	-	3	1
<b>12</b>	2	-	2	3
<b>13</b>	1	1	2	3
<b>14</b>	1	2	4	3
<b>15</b>	6	6	5	-

# Results: Total hours playful sporting games

Sport	DHAQ 1	DHAQ 2	Reliability
All sporting games combined	1900 ± 2313	1998 ± 2230	PA = 42% ± 20% ICC = .77; p < .01

# Results: Total hours playful sporting games

Sport	DHAQ 1	DHAQ 2	Reliability
All sporting games combined	1900 ± 2313	1998 ± 2230	PA = 42% ± 20% ICC = .77; p < .01
1	519 ± 651	419 ± 344	PA = 26% ± 30% ICC = .44; p > .05
2	624 ± 513	975 ± 513	PA = 35% ± 41% ICC = .80; p > .05
3	744 ± 751	827 ± 940	PA = 65% ± 39% ICC = .93; p < .01

<b>Participant</b>	<b>DHAQ 1</b>	<b>DHAQ 2</b>	<b>PA</b>
<b>Mean</b>	519 ± 651	419 ± 344	26% ± 30%
<b>1</b>	205	796	26
<b>2</b>	86	0	0
<b>3</b>	1156	847	73
<b>4</b>	163	-	-
<b>5</b>	385	0	0
<b>6</b>	231	0	0
<b>7</b>	64	-	-
<b>8</b>	1027	205	20
<b>9</b>	86	0	0
<b>10</b>	39	77	51
<b>11</b>	0	-	-
<b>12</b>	2363	-	-
<b>13</b>	762	0	0
<b>14</b>	655	488	75
<b>15</b>	39	103	38

<b>Participant</b>	<b>DHAQ 1</b>	<b>DHAQ 2</b>	<b>PA</b>
<b>Mean</b>	519 ± 651	419 ± 344	26% ± 30%
<b>1</b>	205	796	26
<b>2</b>	86	0	0
<b>3</b>	1156	847	73
<b>4</b>	163	-	-
<b>5</b>	385	0	0
<b>6</b>	231	0	0
<b>7</b>	64	-	-
<b>8</b>	1027	205	20
<b>9</b>	86	0	0
<b>10</b>	39	77	51
<b>11</b>	0	-	-
<b>12</b>	2363	-	-
<b>13</b>	762	0	0
<b>14</b>	655	488	75
<b>15</b>	39	103	38



<b>Participant</b>	<b>DHAQ 1</b>	<b>DHAQ 2</b>	<b>PA</b>
<b>Mean</b>	519 ± 651	419 ± 344	26% ± 30%
<b>1</b>	205	796	26
<b>2</b>	86	0	0
<b>3</b>	1156	847	73
<b>4</b>	163	-	-
<b>5</b>	385	0	0
<b>6</b>	231	0	0
<b>7</b>	64	-	-
<b>8</b>	1027	205	20
<b>9</b>	86	0	0
<b>10</b>	39	77	51
<b>11</b>	0	-	-
<b>12</b>	2363	-	-
<b>13</b>	762	0	0
<b>14</b>	655	488	75
<b>15</b>	39	103	38

# Discussion

- Need to be more thorough in assessment of validity and reliability during collection of developmental histories
  - “Total number of activities” may be misleading
  - “Total cumulative hours of involvement” may be misleading
  - Most appropriate method of data collection?
- Parents as sources of validity?
- Exercise caution when interpreting retrospective data

# Questions?

[melissa.hopwood@live.vu.edu.au](mailto:melissa.hopwood@live.vu.edu.au)



AUSTRALIAN  
INSTITUTE OF SPORT



**VICTORIA  
UNIVERSITY**  
MELBOURNE AUSTRALIA

YORK  
UNIVERSITÉ  
UNIVERSITY 

The logo of York University, featuring a red square with a white 'U' shape inside.